CLAIMS

1-525. (Cancelled)

526. (Currently Amended) A reporter signal peptide with a single Asp-Pro bond from about 10 to about [[35]] 18 amino acids comprising residues 2-11 of SEQ ID NO: 1, ~~a single amino acid sequence Asp-Pro~~ wherein at least four glycine residues contain a heavy isotope, wherein the reporter signal peptide can be fragmented across the Asp-Pro peptide bond by collision-induced dissociation in an ion trap mass spectrometer.

527. (Previously Presented) The reporter signal peptide of claim 526, further comprising a coupling agent for covalent coupling to a protein or a peptide.

528. (Previously Presented) The reporter signal peptide of claim 527, wherein the coupling agent comprises a chemically reactive group.

529. (Withdrawn) The reporter signal peptide of claim 528, wherein the coupling agent further comprises a linker linking the chemically reactive group to the reporter signal peptide.

530. (Previously Presented) The reporter signal peptide of claim 528, wherein the chemically reactive group can covalently couple with a free sulfhydryl group of a cysteine residue.

531. (Previously Presented) The reporter signal peptide of claim 529, wherein the chemically reactive group is selected from the group consisting of thiols, epoxides, or nitriles.

532. (Withdrawn) The reporter signal peptide of claim 528, wherein the chemically reactive group can react with a free amino-terminal primary amino group of a protein or a peptide.

533. (Withdrawn) The reporter signal peptide of claim 532, wherein the chemically reactive group is selected from the group consisting of an NHS ester and an isothiocyanate.

534. (Withdrawn) The reporter signal peptide of claim 533, wherein the chemically reactive group is an NHS ester.

535. (Withdrawn) The reporter signal peptide of claim 528, wherein the coupling agent further comprises a linker.

536-544. (Cancelled)

545. (Currently Amended) The reporter signal peptide of claim [[544]]526, wherein ~~isotopic enrichment comprises a~~ the heavy isotope is ^{13}C ~~atom~~, [[a]] ^{15}N ~~atom, a~~ and/or deuterium ~~atom, or any combination thereof~~.

546. (Previously Presented) A set of reporter signal peptides comprising two or more reporter signal peptides of claim 526, wherein each of the reporter signal peptides has the same molecular mass.

547. (Previously Presented) The set of reporter signal peptides of claim 546, wherein each of the reporter signal peptides has the same mass-to-charge ratio following ionization in a mass spectrometer.

548. (Previously Presented) The set of reporter signal peptides of claim 547, wherein the mass-to-charge ratio of each fragmented reporter signal peptide in the set can be distinguished from the mass-to-charge ratio of the other fragmented reporter signal peptides in the set.

549. (Previously Presented) The set of reporter signal peptides of claim 548, wherein the reporter signal peptides further comprise a coupling agent having a chemically reactive group for covalent coupling to a target protein or peptide.

550. (Previously Presented) The set of reporter signal peptides of claim 549, wherein the chemically reactive group covalently couples a free sulfhydryl group of the target protein or peptide.

551. (Previously Presented) The set of reporter signal peptides of claim 550, wherein the chemically reactive group is selected from the group consisting of: a thiol, an epoxide, and a nitrile.

552. (Withdrawn) The set of reporter signal peptides of claim 549, wherein the chemically reactive group covalently couples an amino-terminal primary amine group of the target protein or peptide.

553. (Withdrawn) The set of reporter signal peptides of claim 552, wherein the chemically reactive group is selected from the group consisting of: an NHS ester, and an isothiocyanate.

554. (Currently Amended) The set of reporter signal peptides of claim 546, wherein the set of reporter signals comprises two or more of CG*G*G*G*DPGGGGR (SEQ ID NO: 1), CG*G*G*GDPGGGG*R (SEQ ID NO: 1), CG*G*GGDPGGG*G*R (SEQ ID NO: 1), CG*GGGDPGG*G*G*R (SEQ ID [[NO.:]]NO: 1), and CGGGGDPG*G*G*G*R (SEQ ID [[NO.:]]NO: 1), wherein each G* is a glycine with at least one heavy isotope.

555-576. (Cancelled)

577. (Previously Presented) A kit comprising:

the set of reporter signal peptides according to claim 546; and

a set of instructions for use.

578. (Previously Presented) The kit of claim 577, further comprising at least one target peptide labeled with a reporter signal peptide of claim 526.

579. (Previously Presented) The kit of claim 578, wherein the protein or peptide comprises a cysteine amino acid residue.

580. (Previously Presented) The kit of claim 577, wherein the set of reporter signals comprises one or more of CG*G*G*G*DPGGGGR (SEQ ID NO: 1), CG*G*G*GDPGGGG*R (SEQ ID NO: 1), CG*G*GGDPGGG*G*R (SEQ ID NO: 1), CG*GGGDPGG*G*G*R (SEQ ID NO: 1), CGGGGDPG*G*G*G*R (SEQ ID NO: 1), wherein each G* is a glycine with at least one heavy isotope.

581. (Previously Presented) A protein or peptide labeled with a reporter signal peptide of claim 526.

582. (Previously Presented) The protein or peptide of claim 581, wherein the protein or peptide comprises a cysteine amino acid residue.

583. (Previously Presented) A set of two or more labeled proteins or peptides according to claim 581.

584. (Previously Presented) A set of labeled peptides or proteins labeled with the set of reporter signal peptides of claims 546.

585. (Previously Presented) A set of labeled peptides or protein labeled with a set of reporter signals, wherein the set of reporter signals comprises one or more of CG*G*G*G*DPGGGGR (SEQ ID NO: 1), CG*G*G*GDPGGGG*R (SEQ ID NO: 1), CG*G*GGDPGGG*G*R (SEQ ID NO: 1), CG*GGGDPGG*G*G*R (SEQ ID NO: 1), CGGGGDPG*G*G*G*R (SEQ ID NO: 1), wherein each G* is a glycine with at least one heavy isotope.